

CLAIMS

What is claimed is:

1. An automated disk drive library, comprising:

a disk drive assembly;

a rack having a drawer for supporting the disk drive assembly;

a picker mechanism for selectively inserting and removing the disk drive assembly relative to the drawer;

control means for controlling operations of the automated disk drive library;

data coupling means for providing a primary data interconnection between the disk drive assembly and the control means;

power means for providing connectorless power from the control means to the disk drive assembly; and

engagement means for automatically engaging and disengaging the disk drive assembly with the drawer.

2. The automated disk drive library of claim 1 wherein the data coupling means is a self-healing coupler having a first element on the disk drive assembly for interconnecting with a second element in the drawer.

1 3. The automated disk drive library of claim 1, further comprising auxiliary
2 means for providing a secondary data interconnection between the disk drive
3 assembly and the control means.

1 4. The automated disk drive library of claim 4 wherein the auxiliary means
2 comprises a sensor mounted to the disk drive assembly for coupling with a probe that
3 is external to the drawer.

1 5. The automated disk drive library of claim 3 wherein the data coupling means
2 and the auxiliary means are each independent, optically-coupled devices.

1 6. The automated disk drive library of claim 1 wherein the power means utilizes
2 a split core transformer on each of the disk drive assembly and the drawer as a
3 magnetic coupling for transferring power to the disk drive assembly.

1 7. The automated disk drive library of claim 1, further comprising sensor means
2 for detecting interconnection of the disk drive assembly with the drawer.

1 8. The automated disk drive library of claim 7 wherein the sensor means
2 comprises a sensor and a magnet on the disk drive assembly that are actuated in
3 response to a position of the disk drive assembly relative to the drawer.

1 9. The automated disk drive library of claim 1 wherein the engagement means
2 comprises sensors for detecting a position of the disk drive assembly relative to the
3 drawer, and a driving mechanism for moving the disk drive assembly relative to the
4 drawer in response thereto.

1 10. The automated disk drive library of claim 1 wherein the picker mechanism
2 magnetically engages and optically couples to the disk drive assembly.

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- 1 11. An automated disk drive library, comprising:
- 2 a disk drive assembly;
- 3 a rack having a drawer for supporting the disk drive assembly;
- 4 a picker mechanism for selectively inserting and removing the disk drive
- 5 assembly relative to the drawer;
- 6 control means for controlling operations of the automated disk drive library;
- 7 optical data coupling means for providing a primary data interconnection
- 8 between the disk drive assembly and the control means;
- 9 magnetic power means for providing connectorless power from the control
- 10 means to the disk drive assembly;
- 11 sensor means for detecting interconnection of the disk drive assembly with the
- 12 drawer; and
- 13 engagement means for automatically engaging and disengaging the disk drive
- 14 assembly with the drawer.

- 1 12. The automated disk drive library of claim 11 wherein the data coupling means
- 2 is a self-healing coupler having a first element on the disk drive assembly for
- 3 interconnecting with a second element in the drawer.

1 13. The automated disk drive library of claim 11, further comprising auxiliary
2 means for providing an optical secondary data interconnection between the disk drive
3 assembly and the control means, wherein the auxiliary means comprises an optical
4 sensor mounted to the disk drive assembly for coupling with an optical probe that is
5 external to the drawer.

1 14. The automated disk drive library of claim 11 wherein the magnetic power
2 means utilizes a split core transformer on each of the disk drive assembly and the
3 drawer as a magnetic coupling for transferring power to the disk drive assembly.

1 15. The automated disk drive library of claim 11 wherein the sensor means
2 comprises a sensor and a magnet on the disk drive assembly that are actuated in
3 response to a position of the disk drive assembly relative to the drawer.

1 16. The automated disk drive library of claim 11 wherein the engagement means
2 comprises sensors for detecting a position of the disk drive assembly relative to the
3 drawer, and a driving mechanism for moving the disk drive assembly relative to the
4 drawer in response thereto.

1 17. The automated disk drive library of claim 11 wherein the picker mechanism
2 magnetically engages and optically couples to the disk drive assembly.

1 18. An automated disk drive library, comprising:

2 a plurality of disk drive assemblies, each having a disk drive mounted to a
3 drive carrier;

4 a rack having a plurality of drawers, wherein each of the drawers supports one
5 of the disk drive assemblies;

6 a picker mechanism for selectively inserting and removing the disk drive
7 assemblies relative to the drawers;

8 control means for controlling operations of the automated disk drive library;

9 an optical self-healing coupler associated with each of the disk drive
10 assemblies and drawers, each of the self-healing couplers having a first element on
11 the disk drive assemblies for interconnecting with a second element in the drawers,
12 wherein the self-healing couplers provide primary data interconnection between the
13 disk drive assemblies and the control means;

14 an optical data sensor mounted to each of the disk drive assemblies opposite
15 the self-healing couplers, wherein the data sensors provide secondary data
16 interconnections between the disk drive assemblies and the control means;

17 a split core transformer on each of the disk drive assemblies and drawers,
18 wherein the split core transformers magnetically couple to transfer power to the disk
19 drive assemblies;

an interconnection sensor and an interconnection magnet on the disk drive assemblies that are actuated in response to a position of the disk drive assemblies relative to the drawers for detecting interconnection of the disk drive assemblies with the drawers;

an engagement sensor and an engagement magnet on the drawers and disk drive assemblies for detecting a position of each of the disk drive assemblies relative to the drawers; and

a driving mechanism in each of the drawers for automatically engaging and disengaging the disk drive assemblies with the drawers in response to detection of the position of the disk drive assemblies relative to the drawers.

19. The automated disk drive library of claim 18 wherein the self-healing coupler is located on a backplane at a rear of the drawer adjacent to a rear of the disk drive assembly, and the data sensor is located on a front of the disk drive assembly.

20. The automated disk drive library of claim 18 wherein, when a break in communication and link at one of the disk drive assemblies occurs, a respective one of the self-healing couplers by-passes said one of the disk drive assemblies while maintaining communications with the other disk drive assemblies.

21. The automated disk drive library of claim 18 wherein the driving mechanism comprises a gear-driven cam in each of the drawers for engaging a pin on respective ones of the disk drive assemblies.

22. The automated disk drive library of claim 18 wherein the picker mechanism magnetically engages and optically couples to the disk drive assembly, and wherein